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Carbon dioxide dynamics in lake Kivu during the dry and wet seasons

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Lakes are significant sources of CO2 to the atmosphere ranging between 0.14 à 0.17 PgC yr-1 globally. This emission of CO2 is comparable to the one from rivers of 0.34 PgC yr-1 and from estuaries of 0.32 PgC yr-1. Africans lakes are characterized by partial pressures of CO2 (p CO2) twice higher than the global average (2300 ppm versus 1060 ppm). Also, African lakes represent about 10% of the total lake surface area (225,000 km2 versus 2426,000 km2). The emission of CO2 is attributed to the net heterotrophy of these systems sustained by the organic carbon inputs from the watershed. However, several unknowns remain on the CO2 dynamics in lakes, in particular African ones : (1) few simultaneous and integrated studies of CO2 dynamics and metabolic performance are available; (2) African lakes are under-sampled in relation to temperate and boreal lakes, (3) most pCO2 estimates in lakes are based on pH and alkalinity measurements with unkown quality, (4) seasonal and diurnal pCO2 variations in lakes are significant but not well constrained, and (5) spatial variability of pCO2 in lakes is strong but not well documented. Here we present preliminary results on CO2 dynamics in surface waters of lake Kivu that was sampled in March 2007 and August 2007, in the frame of the Carbon and Nutrient cycles in lake Kivu (CAKI) project (http://www.co2.ulg.ac.be/kivu.htm).